rays of the solar spectrum are the more active in the process.

It would be easy to multiply criticisms of this kind, but enough has been already said to show that the book is unsuitable for the use of students, at least of those who are not already tolerably advanced. The first essential of a good handbook for students is that it should give a clear and, as far as possible, complete account of the actual attainments of the science of which it treats. This Prof. Müller's book certainly does not do. Many points of importance are either omitted or treated far too superficially, whereas others of less importance are discussed at great length in a highly theoretical manner, which, be it said, is often ingenious and interesting. The book cannot, therefore, be regarded as a successful handbook; its merits are rather those of a treatise upon those parts of the physiology of plants which are susceptible of a physical and mathematical treatment.

It only remains to add that the general appearance of the book, the paper, type, and figures are good, and to express the regret that there is not an alphabetical index at the end which might serve as a guide through the somewhat intricate mazes of the contents.

OUR BOOK SHELF

On the Urari, the Deadly Arrow-poison of the Macusis. By Richard Schomburgk, Ph.D. 4to. Pp. 18. (Adelaide: E. Spiller.)

IN this pamphlet the author describes the researches made by himself and by his brother, Sir Robert Schomburgk, into the modes of preparation of urari. Although an arrow-poison is prepared by a number of Indian tribes in Guiana, and between the Amazon River and the Orinoco, yet that prepared by the Macusi Indians is much stronger, and other tribes come very long distances in order to obtain it. This greater strength is thought by the author to depend upon the use by the Macusi Indians of the *Strychnos toxifera*. The bark of this plant contains all the properties of the urari, and the Macusi Indians add to it a number of other substances. With great difficulty the author prevailed upon an old urari-maker to show him the process of preparing the poison. The ingredients were—bark of *Strychnos toxifera*, 2 lbs.; from Yakki (*Strychnos schomburgkii*), ¼ lb.; Arimaru (*Strychnos cogens*), ¼ lb.; Wakarimo, ¼ lb.; the root of Tarireng, ½ oz.; the root of Tararemu, ½ oz.; the fleshy root of Muramu (*Cissus spec.*); four small pieces of wood of a tree of the species of Xanthoxyleæ, called Manuca. (Manuca is the strong bitter wood of a tree of the Xanthoxyleæ. The bark and the root are used as an effective remedy against syphilitic sickness on the Rio Negro, Amazon, and Rio Branco.)

These ingredients were crushed singly in a mortar, and the bark of *Strychnos tox.* was thrown first into a pot containing about seven quarts of water. As soon as the water began to boil he added at intervals a handful of the other ingredients except the muramu. The whole was then kept boiling very slowly, the foam being carefully skimmed away, for twenty-four hours, the mixture being kept at an equal heat. At the expiration of that time the extract had been reduced by boiling to about a quart, became thick, and assumed the colour of strong coffee. It was then strained through a large funnel made of palm-leaves and filled with fresh silk-grass. The filtrate was exposed in a flat vessel to the sun for about three hours, and he then added the slimy juice expressed from the muramu root, which had been previously soaked for a short time in the boiling poison. The urari immediately underwent a remarkable alteration, curdling to a jelly-like substance. The poison was then poured into very flat earthen vessels, in order to still further concentrate it by exposure to the sun. When it reached the consistency of thick treacle it was poured into small calabashes, where it ultimately changed into a hard substance. During the preparation a number of superstitious precautions are taken, in order, as they imagine, to prevent the poison losing its efficacy. No certain remedy is known for the effects of the poison; those employed by the Indians are the juice of sugar-cane either alone or mixed with an infusion of the leaves of the tree *Eperua falcata*. Salt and urine are sometimes also employed as remedies.

The author mentions the researches on the physiological action of urari by Waterton and Virchow, but seems unaware of, or at least does not allude to, the observations of Bernard, or the more recent works of German observers. This pamphlet is, however, interesting as containing the author's own original observations upon the mode of preparation of the urari, made, as they were, under great difficulties.

Notes of Observations on Injurious Insects. Report, 1879. (London: W. Swan Sonnenschein and Allen, 1880.)

THIS report, for the production of which we are mainly indebted to the exertions of Miss E. A. Ormerod, the Rev. T. A. Preston, and Mr. E. A. Fitch, is, this year, one of unusual interest, inasmuch as it reviews the destructive work of the insect world to our garden and field crops during a summer unequalled for its want of sunshine and continued heavy rains. Moreover, owing to the energy displayed by the editor in inducing gardeners, foresters, &c., to record what observations they may have made, we have, as the result, a very full and very varied report. Notwithstanding that the temperature was below and the rainfall above the average, "the returns show insect attack fully up to the usual amount, and insect presence often exceeding it. The unusual cold of the winter and the depth to which the frost penetrated the ground do not appear to have acted prejudicially on larvæ subjected to them, either at the time or in subsequent development, and the only cases in which the weather appears notably to have had effect in ridding us of insect attack is where the persistent rainfall or the tremendous downpour of summer storms have fairly swept the insects from the plants, or in some cases of leaf-feeders, where the plant-growth has (conjecturally) been driven on past the power of the larvæ."

Referring to the power of the frost "during the past winter" (the report is dated December 19 last), it is stated that at Dalkeith it penetrated the earth to a depth of fifteen inches, while in Perthshire it went down to from twenty to twenty-four inches. Miss Ormerod alludes to the prevalent idea that "cold kills the grubs," and gives her experience of an examination of all larvæ and pupæ found fully exposed to its influence, whether unsheltered, under bark, or in frozen ground. In every case, even where the ground was frozen so hard that it required a hammer to break it, and the larvæ and pupæ were perfectly rigid, on thawing they showed no sign of injury, "and in the case of the larvæ of the cabbage weevil (which was the only instance in which any immediate action was to be expected) they continued the operation of making their earth cases for pupation (as is usual with this grub on disturbance from the gall) as if nothing had happened."

The extreme severity of the winter was also favourable, in other respects, to insect-preservation, large numbers being secured from the attacks of birds by being buried under the snow or in the frost-bound ground.

The report, which embodies notes from observers all over the United Kingdom, is one of very great value not only

to the entomologist, but also to the practical cultivator, whether or field or garden crops. The persistent energy with which Miss Ormerod and her coadjutors have advanced these inquiries, the result of which is the full and elaborate report before us, is worthy of all praise. It is satisfactory to learn that for the coming year a large number of fresh observers have promised their help, and with the hope that this notice may induce some of our readers to communicate their own experiences to Miss Ormerod at Dunster Lodge, Spring Grove, Isleworth, we may perhaps mention the following as a guide to the kind of information required :—

1. Any notes as to the extent of insect injury, and estimated pecuniary loss from such.

2. Remedies found of practical use in checking such ravages.

3. Any notes of coincident circumstances such as of weather influences, or surroundings, or state of the soil which may increase or diminish insect attack.

It is pointed out that even the shortest notes are valuable when collated with others, and the importance of noting down the observations as they occur is also impressed upon observers.

JOHN R. JACKSON

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

The Density of Chlorine

IN NATURE, vol. xxi. p. 350, my friend, Mr. F. D. Brown, argues that the low density of chlorine at high temperatures may be explained on the assumption that it undergoes decomposition in the sense of the equation $Cl_2 = 2Cl$, thereby renewing a suggestion made by Lieben in a communication to the French Academy shortly after the publication of V. and C. Meyer's first paper.

A few days ago it might have been said that, however probable such an explanation might appear to be on general grounds, there was nothing in the Meyers' observations to justify it rather than the alternative hypothesis that the chlorine underwent decomposition into other as yet unknown substances. On the contrary, taking into account Meyer's observations on iodine, which by reason of their greater number may be regarded as furnishing more conclusive testimony than the more limited series with chlorine, there was apparently distinct evidence in favour of the latter view. The dissociation of iodine, according to Meyer, takes place within a range of about 400° C., between 600° and 1,000°, and a further increase of nearly 600° is practically without effect; whereas had the change been of the character indicated by Mr. Brown, a further diminution in density ought to have been observed.

A recent communication to the French Academy by Crafts and Meier, however, materially advances the discussion. These observers maintain that Meyer's estimates of temperature (made by the calorimetric method with a platinum block) are excessive, and that, in fact, the highest temperature realisable with the Perrot gas-furnace (determined by an air thermometric method), is 1,390° instead of about 1,570°. They have also obtained a considerably lower value for the density of iodine at the highest temperature of the furnace, the quotient of the theoretical density ($I_2 = 8{\cdot}786$) by the observed density being ·60 for their highest observation, and ·65 for Meyer's. Their results are as follows :—

Temperature.				Density.		
°						
445	...	...	...	8·70	8·78	8·75
830–880	...	...	...	8·04	8·11	
1,020–1,050	...	...	...	7·02	7·18	6·83
1,275	...	...	...	6·07	5·57	
1,390	...	...	...	5·23	5·33	

Should it ultimately be proved that the molecules of the halogens are thus dissociable, our present views regarding phenomena such as the nascent state and the influence of light in inducing hydrogen and chlorine to enter into reaction will meet with much support; the appeal as to their elementary nature will then be entirely thrown on the spectroscope for decision.

London Institution, April 10 HENRY G. ARMSTRONG

The Omori Shell Mounds

I HAVE received the enclosed letter from Prof. Morse, with a request that I should forward it to you. I hope that it may be published, for the article in NATURE to which it refers seemed to me to do very scant justice to Prof. Morse's work. I refer more especially to the evidence adduced by him on cannibalism by the ancient inhabitants of Japan—on their platycnemic tibiæ—on their degree of skill in ceramic art—and beyond all other points, on the changes in the molluscan fauna of the islands since the period in question.

It is a remarkable fact, which incidentally appears in Prof. Morse's memoir, that several Japanese gentlemen have already formed large collections of the shells of the Archipelago, and have zealously aided him in the investigation of the prehistoric mounds. This is a most encouraging omen of the future progress of science in Japan. CHARLES DARWIN

Down, Beckenham, Kent, April 9

IN NATURE, vol. xxi. p. 350, is a review of my memoir on "The Omori Shell Mounds" by Fredk. V. Dickins. I do not now heed the spirit in which it is written, nor would I deem it worthy of notice did it not occur in the pages of your widely-read magazine. One expects in a reviewer some knowledge of the subject he reviews. Mr. Dickins, by a series of mistakes, betrays his ignorance of the whole matter. The extraordinary blunder he makes regarding the Ainos has already been promptly corrected by a Japanese gentleman residing in London. It is charitable to assume that Mr. Dickins has not lived in Japan, otherwise he would not, in common with so many of his countrymen, commit the wilful blunder of calling the principal city of the empire by its wrong name. On the other hand, it is impossible he could have seen the Omori deposits, otherwise he would not make another blunder by expressing his belief that they have been completely swept away, when in truth but a small portion of them have been removed. He says: "These mounds consist for the most part of shells, little, if at all, distinguishable from what are still found in abundance along the shores of the Gulf of Yedo." Had he taken the trouble to read the memoir he attempted to review he would have seen that all the species occurring in the mounds vary in size, proportion of part, and relative abundance of individuals from similar species living along the shores to-day. That some species extremely abundant in the mounds are scarcely met within the vicinity, while one species has never been found within 400 miles of Omori; indeed, it belongs to a different zoological province!

His complaint at the large number of plates given to the illustration of pottery, tablets, &c., shows how incapable he is of appreciating that part of the work which has received the highest commendation from archæologists, namely, the presenting as far as possible an exhaustive illustration of every form of vessel and variety of ornamentation. He laments the absence of a plate giving figures of the bones and shells, especially of the latter, which are stated to belong to extinct species. Had he looked at the last plate (a copper plate, by the way, and not a lithographic one, as he calls it) he would have seen every species, with one exception, figured, when similar forms from the neighbouring shores could be got for comparison.

I did not feel justified in comparing shell-mound forms with similar forms from Niigata, Kobe, or Nagasaki, and the reason will be obvious to any one having the slightest familiarity with the variations that species show in widely separated localities.